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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

Appl. No.	:	09/621,407	Confirmation No. 4092
Applicants	:	Domino et al.	
Filed	:	July 21, 2000	
Art Unit	:	2686	
Examiner	:	Naghmeh Mehrpour	
Docket No.	:	13629.0030	
Customer No.	:	33629	

> Certificate of Mailing Under 37 C.F.R. 1.8(a)
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ATTENTION: Board of Patent Appeals and Interferences

TRANSMITTAL OF APPEAL BRIEF

In accordance with the requirements of 37 C.F.R. §§ 1.192, attached please find Appellant's Brief for consideration by the U.S. Patent and Trademark Office in connection with its examination of the above-referenced patent application. Three copies are enclosed herewith.

A fee in the amount of $500.00 is believed to be due with the Appeal Brief, and a check in the amount of $500.00 is enclosed herewith; however, the Commissioner of Patents and Trademarks is hereby authorized to charge any fee deficiency or to credit any fee overpayment relating to this matter to Deposit Account No. 50-0530.

Dated: November 2, 2005

Respectfully submitted,

GODWIN GRUBER LLP

By: ______________________

Christopher J. Rourk
Reg. No. 39,348

1201 Elm St., Suite 1700
Dallas, TX 75270
Telephone: (214) 939-8657
Facsimile: (214) 760-7332
email: crourk@godwingruber.com

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APPELLANT'S BRIEF (37 C.F.R. 1.192)

This brief is in furtherance of the Notice of Appeal, filed in this case on September 2, 2005 and the Final Office Action mailed October 14, 2005. It is noted that the Final Office Action mailed June 2, 2005 did not explicitly address the grounds for rejection of claim 23. Accordingly, the Applicant requested the Examiner to explicitly address the rejection of claim 23. In response, the Examiner issued the amended Final Office Action on October 14, 2005, which is being appealed although it issued after the notice of appeal was filed. It is further noted that the Final Office Action mailed October 14, 2005 recites exactly the same matter as the prior final office action, and does not specifically address the grounds of rejection for claim 23 (it is lumped into a rejection of claims 4 and 20 that does not specifically address either of those claims).

The fees required under § 1.17(c), and any required petition for extension of time for filing this brief and related fees are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief is transmitted in triplicate. (37 C.F.R. §1.192 (a)).

This brief contains these items under the following headings, and in the order set forth below (37 C.F.R. 1.192(c)):

I REAL PARTY INTEREST
II RELATED APPEALS AND INTERFERENCES
III STATUS OF CLAIMS
IV STATUS OF AMENDMENTS
V SUMMARY OF INVENTION
VI ISSUES
VII GROUPING OF CLAIMS
VIII ARGUMENTS

☒ ARGUMENT: VIII(iii) REJECTIONS UNDER 35 U.S.C. 102

☒ ARGUMENT: VIII(iv) REJECTIONS UNDER 35 U.S.C. 103

IX APPENDIX

The final page of this brief bears the practitioner's signature.

I REAL PARTIES IN INTEREST (37 C.F.R. §1.192 (c)(1))

The real party in interest in this appeal is:

☒ the following party:

Skyworks Solutions, Inc., by an assignment from the Inventors to Conexant Systems, Inc., recorded at Reel 011001, Frame 0229 on 7/21/2000; an assignment from Conexant Systems, Inc, to Washington Sub., Inc., recorded at Reel 13177, Frame 505 on 8/14/2002; the merger of Washington Sub., Inc. into Alpha Industries, Inc., recorded at Reel 13239, Frame 758 on 9/3/2002; and the merger of Alpha Industries, Inc. into Skyworks Solutions, Inc., recorded at Reel 13450, Frame 880 on 10/6/2003.

II RELATED APPEALS AND INTERFERENCES (37 C.F.R. §1.192(c)(2))

With respect to other appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in the pending appeal:

A ☒ there are no such appeals or interferences.

III STATUS OF CLAIMS (37 C.F.R. §1.192(c)(3))

A. TOTAL NUMBER OF CLAIMS IN APPLICATION

Claims in the application are: 23

B. STATUS OF ALL THE CLAIMS IN APPLICATION

1. Claims rejected: Claims 1 through 23

C. CLAIMS ON APPEAL

The claims on appeal are: Claims 1 through 22

IV STATUS OF AMENDMENTS (37 C.F.R. 1.192(c)(4))

No amendments have been submitted subsequent to the final rejection of the claims.

V SUMMARY OF INVENTION (37 C.F.R. 1.192(c)(5))

The invention set forth in Claims 1 through 22 pertains to a system for transmitting and receiving data, as generally shown in Figure 1 of the drawings and described at pages 5 through 8 of the specification. The system includes a direct-conversion receiver receiving a signal modulated on a carrier frequency signal, as generally shown in Figure 1 of the drawings and as described at pages 7 through 12 of the specification. The direct-conversion receiver further comprises one or more subharmonic local oscillator mixers, as generally shown in Figure 1 of the drawings and as described at pages 7 through 12 of the specification. A local oscillator coupled to the direct conversion receiver generates a signal having a frequency equal to a

subharmonic of the carrier frequency signal, as generally shown in Figure 1 of the drawings and as described at pages 7 through 12 of the specification. A transmitter is coupled to the local oscillator, as generally shown in Figure 1 of the drawings and as described at pages 5 through 8 of the specification.

VI ISSUES (37 C.F.R. §1.192(c)(6))

1. Whether claims 1-4, 11-13, 19-20 and 23 are unpatentable under 35 U.S.C. § 102(e) over U.S. Patent No. 6,104,745 to Koh (hereinafter "Koh").

2. Whether claims 5-8, 10, 14-15 and 21-22 are unpatentable under 35 U.S.C. § 103(a) over Koh in view of U.S. Patent No. 6,397,044 to Nash (hereinafter "Nash").

3. Whether claims 9 and 16-18 are unpatentable under 35 U.S.C. § 103(a) over Koh in view of Nash in further view of U.S. Patent No. 5,152,005 to Bickley.

VII GROUPING OF CLAIMS (37 C.F.R. §1.192(c)(7))

The claims on appeal do not stand or fall together and are believed to be separately patentable.

VIII(iii) ARGUMENTS—REJECTIONS UNDER 35 U.S.C. § 102 (37 C.F.R. 1.192(c)(8)(iii))

The construction of claim 1 adopted by the Examiner is incorrect, and is used to improperly reject claim 1 over Koh. Claim construction is a question of law, and is reviewed *de novo*. *Markman v. Westview*, 52 F. 3d 967, 34 USPQ2d 1321 (Fed. Cir. 1995), *aff'd* 116 S.Ct. 1384 (1996).

As an initial point, the Applicants note that the Examiner has made a number of errors that obfuscate the rejection of claim 1. For example, the Examiner states that claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Koh et al. (US Patent Number 6,397,044). Nevertheless, the correct patent number for Koh is 6,104,745, and it appears that the Examiner is

primarily relying on U.S. Patent 6,104,745 as the basis for the rejection of claim 1, except that the Examiner does refer to "figure 2, Rx VCO," which is an item on the drawings for U.S. Patent 6,397,044 to Nash. As such, the Examiner has cited to features in two different references as a basis for a rejection under 35 U.S.C. 102(e), which is improper.

Claim 1 includes a "a direct-conversion receiver receiving a signal modulated on a carrier frequency signal, the direct-conversion receiver further comprising one or more subharmonic local oscillator mixers; a local oscillator coupled to the direct conversion receiver, the local oscillator generating a signal having a frequency equal to a subharmonic of the carrier frequency signal; and a transmitter coupled to the local oscillator." In rejecting claim 1, the Examiner states that Koh teaches "a direct conversion receiver 226 receiving a signal modulated on a carrier frequency signal," citing to col. 4, lines 32-41 of Koh. However, that section of Koh states that the "amplified signal is mixed by the first frequency mixer 226 with the oscillation frequency generated by the PLL 230." Thus, element 226 of Koh is not a direct conversion receiver but is instead a first frequency mixer, and the construction of first frequency mixer 226 as a direct conversion receiver is clearly incorrect and must be reversed.

The Examiner also states that Koh discloses that the direct conversion receiver further comprises "one or more sub harmonic local oscillator (230 + 232) mixers 228 (col 4 lines 58-67, col. 5 lines 1-3)." Nevertheless, element 230 is a phase locked loop, element 232 is a 90 degree phase shifter, and element 228 is a second frequency mixer. Thus, the Examiner has construed a single element, namely a sub-harmonic local oscillator mixer, to be three different elements - a phase locked loop, a 90 degree phase shifter, and a second frequency mixer. This construction is clearly incorrect. Even if the extraneous phase shifter limitation is excluded from the construction, the combination of a phase locked loop and a second frequency mixer would not be related to a sub-harmonic local oscillator mixer unless the phase locked loop was operating at a

sub-harmonic frequency. Nothing in Koh suggests that phase locked loop 230 operates at a sub-harmonic frequency. In fact, the Examiner relies on two erroneous bases for asserting that phase locked loop 230 of Koh operates at a sub-harmonic frequency. The first of these is a reference to the sub-harmonic Rx VCO in figure 2 of Nash, which, as previously discussed, cannot provide any basis for the rejection under 35 U.S.C. 102(e) over Koh. The second is the assertion by the Examiner at page 2, paragraph 2 of the final office action that "phase shifter 232 creates sub harmonic." This assertion is clearly technically incorrect, as well as grammatically incorrect – the frequency of a signal is not changed merely by changing its phase. The Examiner's construction is all the more confusing in light of the admission by the Examiner in the subsequent rejection of claims 5-6 under 35 U.S.C. 103(a) over Koh in view of Nash that "Koh fails to teaches a system further comprising a frequency multiplier coupled between the local oscillator and the transmitter." How can PLL 230 operate at a sub-harmonic of the carrier and then be used as a transmit oscillator? It can't, and as such, the construction of a "sub harmonic local oscillator mixer" adopted by the Examiner is incorrect and must be reversed.

Further evidence of the incorrect construction by the Examiner of "a local oscillator 230 coupled to the direct conversion receiver (see figure 2, RxVCO), the local oscillator 230 generating a signal having a frequency equal to a sub harmonic . . . of the carrier frequency signal" is given by the recognition by the Examiner that "PLL 230 is the transmitter." If PLL 230 is the transmitter, then it must operate at the carrier frequency in the full-duplex system of Koh, where the transmitted and received signals are at the same (*i.e.* carrier) frequency. As such, the construction of PLL 230 as "generating a signal having a frequency equal to a sub harmonic . . . of the carrier frequency signal" is incorrect and must be reversed.

The Examiner applies the same grounds of rejection for system claim 1 to method claim 11, and while the claims are drawn to different limitations, the reasons for error in claim

construction that were discussed in regard to claim 1 also apply to claim 11. Claim 11 includes a "method for receiving and transmitting data comprising: receiving a carrier signal modulated with a data signal; mixing the carrier signal with a subharmonic local oscillator signal to extract a baseband signal; multiplying the subharmonic local oscillator signal; and modulating an outgoing data signal with the multiplied subharmonic local oscillator signal." As discussed, PLL 230 of Koh does not operate at a subharmonic of the carrier signal, but rather at the carrier signal. It is further noted that the Examiner has not even addressed the step of "multiplying the subharmonic local oscillator signal," and in light of the Examiner's admission that Koh fails to disclose a multiplier, the construction of claim 11 as being anticipated by Koh is clearly improper and should be reversed.

Likewise, claim 20 includes different limitations from claim 1 or claim 11, but the reasons for error in claim construction that were discussed in regard to claims 1 and 11 also apply to claim 20. For example, the Examiner construes PLL 230 as "a local oscillator . . . generating a signal having a sub harmonic frequency of the carrier signal," but as previously discussed, Koh entirely fails to disclose any multiplier that would allow PLL 230 to be a local oscillator generating a signal having a subharmonic frequency of the carrier signal and to also satisfy the limitation of "a modulator 242 coupled to the . . . local oscillator . . ., the modulator receiving an outgoing data signal and modulating the outgoing data signal onto the . . . local oscillator signal . . . to generate an outgoing modulated carrier signal," such as where the modulator includes a multiplier. As such, the construction of claim 20 as being anticipated by Koh is clearly improper and should be reversed.

VIII(iv) ARGUMENTS—REJECTIONS UNDER 35 U.S.C. §103 (37 C.F.R. 1.192(c)(8)(iv))

As previously discussed, the Examiner does admit in the discussion of the rejection of claims 5-6, 10, 14-15, and 21-22 under 35 U.S.C. 103(a) as being unpatentable over Koh in view of Nash that Koh "fails to teach a system further comprising a frequency multiplier coupled between the local oscillator and the transmitter, where the frequency multiplier increases the frequency of the oscillator," but then construes that multiplier to phase locked loop 33 of Nash. However, this construction is contradicted by consideration of Nash as a whole, which discloses a transmit voltage controlled oscillator 31 that is directly connected to a power amplifier module without any multiplier. At col. 4, lines 43-46 of Nash, the function of the phase locked loop 33 is disclosed: "The phase locked loop up-converts the frequency of a baseband signal f_{bb} to a frequency for transmission, i.e. the PLL frequency modulates the carrier at a rate of f_{bb}." It is clear from consideration of Nash that phase locked loop 33 ***modulates*** the local oscillator frequency, but does not ***increase*** the local oscillator frequency. This can also be seen from Figure 1 of Nash, which discloses the sub-harmonic receiver oscillator RxVCO (which is relied on by the Examiner in the rejection of the claims under 35 U.S.C. 102) and the transmit oscillator 31, which operates at the carrier frequency. Likewise, claim 6 includes the system of claim 5 wherein "the frequency multiplier increases the frequency of the oscillator up to the frequency of the carrier signal." Again, even if the phase locked loop somehow increases the local oscillator frequency of the receive oscillator, it does not increases the frequency of the receive oscillator up to the frequency of the carrier signal, because there is a separate transmit oscillator that operates at the frequency of the carrier signal. Thus, the construction adopted by the Examiner is fundamentally flawed, and must be reversed.

In regards to claims 7 and 8, the Examiner errs in construing quadrature phase shift keyed modulation to be phase modulation. While Nash does disclose in-phase and quadrature phase signals, that alone is not enough to establish quadrature phase shift keying. In fact, just past the section of Nash cited by the Examiner as support for the rejection of claim 7 is a statement that makes it clear that Nash only discloses phase modulation, and not quadrature phase shift keying: "The VCO outputs a signal f_{tx} having a peak frequency shift Δf_{tx} proportional to the amplitude of the applied modulating signal, leading to a peak frequency deviation of $f_{tx} \pm \Delta f_{tx}$." Nash, col. 5, lines 52-55. As such, it is clear that the frequency modulation is proportional to the amplitude variations and is not related to quadrature phase shift keying. The construction of claims 7 and 8 by the Examiner is fundamentally flawed, and must be reversed.

The Applicants note that in the final rejection, the Examiner states that claim 19 is rejected under 35 U.S.C. 102, but then discusses the rejection of claim 19 under 35 U.S.C. 103. Thus, it is clear that the Examiner rejects that claim under 35 U.S.C. 103, and the Board of Patent Appeals and Interferences does not need to return this action to the Examiner for clarification. It is further noted that the Examiner's construction of claim 19 is incorrect, as claim 19 states "modulating the outgoing data signal with the subharmonic local oscillator signal comprises: modulating an outgoing in-phase data signal and an outgoing quadrature phase data signal with the subharmonic local oscillator signal at a subharmonic modulation index to generate a modulated outgoing data signal," which the Examiner construes as modulation with subharmonic local oscillator 22 signal of Nash. However, the section of Nash cited in support of this construction discusses modulation with the transmitter Voltage Controlled Oscillator 37, see col. 4, lines 54-65. The transmitter VCO 37 of Nash operates at the carrier frequency, **not** at a subharmonic frequency. Thus, the construction of claim 19 is fundamentally flawed, and must be reversed.

In regards to claims 10 and 14-15, the Examiner admits that Koh modified by Nash does not disclose a frequency modulator, but then construes phase modulation to be frequency modulation ("However Koh system does modulates frequency, which is vary at the rate of the modulating wave from amplitude, which is call phase modulation.") Phase modulation is simply not frequency modulation. In phase modulation, the frequency of the carrier signal remains the same but the phase is varied to encode amplitude variation, whereas in frequency modulation, the frequency of the carrier signal varies within a band around the central carrier frequency. Although the Examiner also appears to reject claims 10 and 14-15 based on official notice that "[f]requency Modulation is a common way of modulating frequencies and is well known in the art," no attempt is made by the Examiner to explain how the system of Koh as modified by Nash would need to be modified to allow the phase modulated signal to be frequency modulated. At a minimum, Koh as modified by Nash fails to disclose each element of the invention of claims 10 and 14-15, and therefore fails to provide a prima facie basis for the rejection of those claims.

In regards to the rejection of claims 9 and 16-18 over Koh in view of Nash and further in view of Bickley, the Applicants note that neither Koh, Nash nor Bickley disclose a subharmonic local oscillator that is used as the transmit and receive local oscillator. Furthermore, Bickley fails to disclose "a switch coupled between the local oscillator and the phase locked loop, wherein the switch can couple the phase locked loop to the local oscillator during a transmit cycle and can decouple the phase locked loop from the local oscillator during a receive cycle." While Bickley discloses a switch coupled to an oscillator, it is not a local oscillator that is used for transmitting and receiving. Thus, the Examiner's construction of the local oscillator of claims 9 and 16-18 as being any oscillator in a circuit is in error and must be reversed.

All other claims that were not specifically addressed are dependent and are allowable at least for the reasons that they depend from allowable base claims and add limitations not found

in the prior art. Although they are not specifically traversed herein, the Applicants reserve the right to specifically traverse such dependent claims in response to the Examiner's Answer, if the Examiner's Answer raises issues in which such claims become relevant to this appeal.

IX APPENDIX OF CLAIMS (37 C.F.R. 1.192(c)(9))

The text of the claims involved in the appeal are:

1. A system for transmitting and receiving data comprising:

a direct-conversion receiver receiving a signal modulated on a carrier frequency signal, the direct-conversion receiver further comprising one or more subharmonic local oscillator mixers;

a local oscillator coupled to the direct conversion receiver, the local oscillator generating a signal having a frequency equal to a subharmonic of the carrier frequency signal; and

a transmitter coupled to the local oscillator.

2. The system of claim 1 wherein the direct conversion receiver further comprises:

a phase shifter coupled to a first subharmonic local oscillator mixer, where the output of the first subharmonic local oscillator mixer is used to generate a quadrature signal of a phase shift keyed signal; and

a second subharmonic local oscillator mixer, where the output of the second subharmonic local oscillator mixer is used to generate an in-phase signal of a phase shift keyed signal.

3. The system of claim 2 wherein the phase shifter is further coupled to the local oscillator.

4. The system of claim 2 further comprising a low-noise amplifier coupled to the phase shifter, wherein the signal modulated on the carrier frequency signal is received by the low-noise amplifier and is transmitted to the phase shifter after being amplified.

5. The system of claim 1 further comprising a frequency multiplier coupled between the local oscillator and the transmitter, wherein the frequency multiplier increases the frequency of the oscillator.

6. The system of claim 5 wherein the frequency multiplier increases the frequency of the oscillator up to the frequency of the carrier signal.

7. The system of claim 1 wherein the transmitter comprises:

a frequency multiplier coupled to the local oscillator; and

an in-phase/quadrature modulator coupled to the frequency multiplier, receiving an in-phase modulation input signal and a quadrature modulation input signal, and outputting a quadrature phase shift keyed signal modulated at the multiplied local oscillator frequency.

8. The system of claim 1 wherein the transmitter comprises:

an in-phase/ quadrature modulator coupled to the local oscillator, receiving an in-phase modulation input signal and a quadrature phase shift keyed signal modulated at the local oscillator frequency; and

a frequency multiplier coupled phase/quadrature modulator and multiplying the quadrature phase shift keyed signal.

9. The system of claim 1 wherein the transmitter comprises:

a frequency modulator coupled to the local oscillator, wherein the local oscillator is modulated by the frequency modulator;

a phase locked loop coupled to the frequency modulator and the local oscillator; and

a switch coupled between the local oscillator and the phase locked loop, wherein the switch can couple the phase locked loop to the local oscillator during a transmit cycle and can decouple the phase locked loop from the local oscillator during a receive cycle.

10. The system of claim 1 wherein the transmitter comprises:

a frequency modulator coupled to the local oscillator, where the local oscillator is modulated by the frequency modulator;

a voltage-controlled reference oscillator coupled to the frequency modulator, where the voltage-controlled reference oscillator is modulated by the frequency modulator; and

a phase locked loop coupled to the local oscillator in a feedback loop, the phase locked loop further coupled to the voltage controlled oscillator.

11. A method for receiving and transmitting data comprising:

receiving a carrier signal modulated with a data signal;

mixing the carrier signal with a subharmonic local oscillator signal to extract a baseband signal;

multiplying the subharmonic local oscillator signal; and

modulating an outgoing data signal with the multiplied subharmonic local oscillator signal.

12. The method of claim 11 wherein mixing the carrier signal with the subharmonic local oscillator signal to extract the baseband signal further comprises:

mixing the carrier signal with the subharmonic local oscillator signal to extract an in-phase signal;

phase-shifting the subharmonic local oscillator signal; and

mixing the carrier signal with the phase-shifted subharmonic local oscillator signal to extract a quadrature phase signal.

13. The method of claim 11 wherein mixing the carrier signal with the subharmonic local oscillator signal to extract the baseband signal further comprises:

mixing the carrier signal with the subharmonic local oscillator signal to extract an in-phase signal; phase-shifting the carrier signal; and

mixing the phase-shifted carrier signal with the subharmonic local oscillator signal to extract a quadrature phase signal.

14. The method of claim 11 wherein modulating the outgoing data signal with the subharmonic local oscillator signal comprises:

multiplying the subharmonic local oscillator signal; and

modulating an outgoing in-phase data signal and an outgoing quadrature phase data signal with the multiplied subharmonic local oscillator signal.

15. The method of claim 11 wherein modulating the outgoing data signal with the subharmonic local oscillator signal comprises:

modulating an outgoing in-phase data signal and an outgoing quadrature phase data signal with the subharmonic local oscillator signal to generate a modulated outgoing data signal; and

multiplying the modulated outgoing data signal to generate the outgoing data signal.

16. The method of claim 11 wherein modulating the outgoing data signal with the subharmonic local oscillator signal comprises:

frequency modulating the subharmonic local oscillator signal during a transmit cycle; and

interrupting frequency modulation of the subharmonic local oscillator signal during a receive cycle.

17. The method of claim 16 further comprising opening a phase locked loop during the transmit cycle to lock the subharmonic local oscillator signal.

18. The method of claim 16 further comprising frequency modulating a reference oscillator signal of a phase locked loop that locks the subharmonic local oscillator signal.

19. The method of claim 11 wherein modulating the outgoing data signal with the subharmonic local oscillator signal comprises:

modulating an outgoing in-phase data signal and an outgoing quadrature phase data signal with the subharmonic local oscillator signal at a subharmonic modulation index to

generate a modulated outgoing data signal; and

multiplying the modulated outgoing data signal by an inverse subharmonic to generate the outgoing data signal.

20. A system for transmitting and receiving data comprising:

a low noise amplifier receiving a modulated incoming carrier signal having a carrier signal frequency;

a local oscillator generating a signal having a subharmonic frequency of the carrier signal;

a first mixer coupled to the low noise amplifier and the local oscillator, the first mixer receiving the modulated incoming carrier signal and generating an in-phase incoming data signal;

a second mixer coupled to the low noise amplifier and the local oscillator, the second mixer receiving the modulated incoming carrier signal and generating a quadrature phase incoming data signal;

a modulator coupled to the local oscillator, the modulator receiving an outgoing data signal and modulating the outgoing data signal onto the local oscillator signal to generate an outgoing modulated carrier signal; and

a transmit amplifier coupled to the modulator, the transmit amplifier amplifying the outgoing modulated carrier signal to a transmission power level.

21. The system of claim 20 further comprising a general purpose computing platform coupled to the first mixer, the second mixer, and the modulator, the general purpose computing platform decoding an incoming data signal from the in-phase incoming data signal

and the quadrature phase incoming data signal, and generating the outgoing data signal.

22. The system of claim 20 further comprising a telephone handset coupled to the first mixer, the second mixer, and the modulator, the telephone handset decoding an

incoming data signal from the in-phase incoming data signal and the quadrature phase incoming data signal, and generating the outgoing data signal.

23. The system of claim 20 wherein an antenna is directly connected to the low noise amplifier, and the low noise amplifier is directly connected to the one or more subharmonic local oscillator mixers.

Dated: September 26, 2005

Respectfully submitted,

GODWIN GRUBER LLP

By:________________________
Christopher J. Rourk
Reg. No. 39,348

1201 Elm St., Suite 1700
Dallas, TX 75270
Telephone: (214) 939-8657
Facsimile: (214) 760-7332